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point of view. His views we may present in a subsequent number of this magazine.—*A. S. Packard.*

#### EXPLANATION OF THE FIGURES.

LETTERING.—*a*, *a*, circular thickening of the skin surrounding the opening of the olfactory pit; *ax*, thread-like continuation of the nerve-cell; *b*, vesicle-like bottom of the olfactory pit, through which the olfactory style passes; *br*, bristle in Fig. 3, stout, and protecting the olfactory pit; *bs*, bent bristle or seta; *ch*, chitinous integument of the antennæ; *d*, seen in section; *f*, invaginated pit; *fv*, Forel's flask-shaped organ; *fvo*, its opening seen from the surface; *gl*, gland-like mass of cells; *hyc*, hypodermic cells; *i*, entrance into the canal belonging to the pit; *m*, olfactory membrane; *m'*, *m''*, *mc*, membrane-forming cell; *n*, nerve of special sense; *nc*, nucleus of the sense- or ganglion-cell; *o*, opening into the olfactory pit; *p*, olfactory pit; *cp*, compound pits; *pw*, wall of the pit; *s*, a large seta; *sc*, sense- or ganglion-cell; *st*, olfactory or sense-style, sometimes peg-shaped; *tb*, tactile bristle.

FIG. 1. Olfactory organ of *Caloptenus*.

FIG. 2. Longitudinal section through the third antennal joint of a fly (*Cyrtoneura stabulans*), showing the compound pits from above and in section.

FIG. 3. Vertical section through a single olfactory pit in the antenna of the horse-fly (*Tabanus bovinus*).

FIG. 4. Antennal pit of *Melolontha vulgaris*, seen in vertical section.

FIG. 5. Section through an olfactory pit of *Vespa crabro*.

FIG. 6. Section through antennal joint of *Vespa crabro*, showing the great number of olfactory pits, the olfactory and tactile bristles.

FIG. 7. Olfactory pits of the antenna of *Melolontha vulgaris*.

FIG. 8. Olfactory pits of the antenna of *Stenobothrus*.

FIG. 9. Olfactory pits of the antenna of *Vespa vulgaris*.

FIG. 10. Olfactory pits of the antenna of *Formica*.

FIG. 11. Olfactory pits of the antenna of *Bombus*. FIGS. 7-11, after Kraepelin.

FIG. 12. Organ of smell of *Anophthalmus*. After Hauser.

#### ZOOLOGY.

**Notes on the Larger Florida Planorbes.**—Having occasion lately to examine a number of Planorbes from Florida, I noticed that considerable confusion exists in the names various collectors give the species. I give below notes on all the species I have received from the State.

*Planorbis trivolvis* Say.

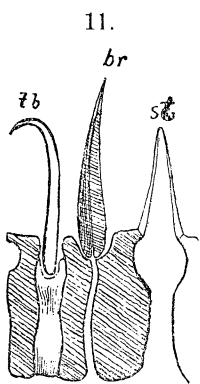
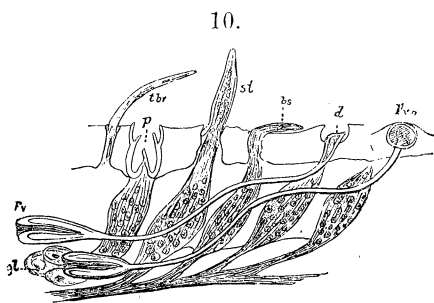
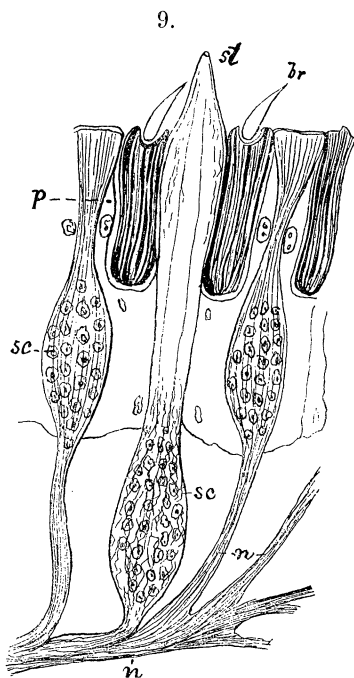
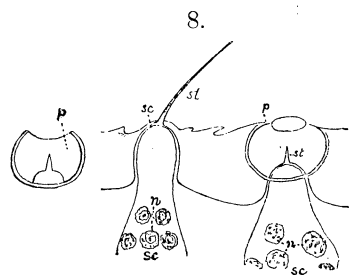
*P. bicarinatus* Say. Northern Florida. Stearns has recorded this species from several Pacific coast localities. I found it abundant and typical in Southern Texas. It has, thus, a range nearly as extensive as the *P. trivolvis*.

*P. tumidus* Pfr. is not an uncommon species in the peninsula, though hitherto overlooked, probably confused with *glabratus* or *trivolvis*. This shell is quite distinct from all other Florida species. Several rather immature specimens, apparently the same, have been sent me from Wacama Lake, N. C.

*P. glabratus* Say. *P. duryi*, var. *intercalaris*, approaches this species in some characters. From the other known Planorbes, *glabratus* is quite distinct. Distribution probably the same as *P. tumidus*, but decidedly local, according to the information given by my correspondents.

*P. duryi* Wetherby is a form widely spread and apparently

# PLATE XV.



ORGANS OF SMELL IN INSECTS.

abundant in the peninsula, but usually *not* rightly named in cabinets. It varies greatly in form from typical *duryi*, which is four-whorled, carinated above to the aperture, and has only a fraction over one whorl visible on base, to a flatter, more discoidal form which I have called var. *intercalaris*, showing over three whorls of base, and with the outer whorl rounded above, much as in *glabratus* Say. Other specimens have the whorl ascending at aperture, and, as Say would put it, "labrum horizontally sub-rectilinear." This form is usually marked "*lentus* Say" in collections, sometimes "*corpulentus* Say," but the solidity, polished surface, etc., at once separate *duryi* in all its varieties from these shells and from *trivolvus* Say. Somewhat malleated specimens are also found, and the uptilting of inner whorls mentioned in Wetherby's description is a not uncommon variation in the typical form. This species is allied on one hand to *glabratus* Say, and in other characters approaches

*P. scalaris* Jay,—a snail which is placed in a different genus by nearly every author who mentions it. After figuring in Paludina, in Physa, and in the exotic genus Ameria, it may finally be located in the Helisoma<sup>1</sup> section of Planorbis, with all the foregoing species. Although the resemblance of *P. scalaris* to the young of normal Planorbis is quite marked, it is probably not in any true sense a case of persistence of embryonic characters. Its derivation from some such discoidal species as the *P. duryi* is more likely.—Harry A. Pilsbry.

**Is Littorina litorea Introduced or Indigenous?**—In regard to the question as to whether *Littorina litorea* is introduced or indigenous, Dr. Dawson has informed the writer of the article on this subject in the AMERICAN NATURALIST for November, that he collected the shell at Pictou, N. S., as far back as 1840, and probably earlier. Dr. Dawson says, further, that *L. litorea* "is and has long been widely distributed in Northumberland Strait and its vicinity, and that specimens authenticating this may be found in my collections in the Peter Redpath Museum of McGill University." Dr. Dawson believes, from its wide distribution so far back, that "it is a regular and probably aboriginal member of the fauna of Acadia."

It is with great diffidence that the writer ventures to disagree with so thorough a student of these matters as Dr. Dawson. But he is unable to see that anything is proven by this new addition to our knowledge of the distribution of the shell, except that it existed upon our shores earlier and more widely spread than

<sup>1</sup> Helisoma naturally includes not only such species as *bicarinatus* Say and *lordi* Bd., but all the large American species which have the inner whorls of spire sharply carinated above, whether the aperture be rounded or angular in the adult. All the species placed in the typical section of Planorbis in Land and Fresh-Water Shells, Pt. II., except *havanensis* and *liebmanni*, which I have elsewhere shown to belong in Segmentina, and *Subcrenatus* Cpr., belong in the section Helisoma.

we supposed. We cannot perceive that it affects the evidence tending to show that it has been introduced.—*W. F. Ganong*.

**Development of Alpheus.**—Mr. F. H. Herrick contributes to No. 54 of the Circulars of Johns Hopkins University an account of his researches on the development of several species of the shrimp *Alpheus*. There is a small cup-shaped gastrula, and the early rudiments of the embryo have a V-shaped outline, the base of the V being formed by the rudimentary abdomen. The three nauplius appendages appear nearly simultaneously, and the upper lip grows out between the first and second antennæ. The later history of the eyes is traced, but the optic invagination described by Reichenbach in *Astacus* and Kingsley in *Crangon* was not noticed.

**Deep-Sea Isopoda.**—In the *Transactions of the Zoological Society* (vol. xii. pp. 77-141, pls. 16-27, 1886) the Rev. A. M. Norman and the Rev. T. R. R. Stibbing enumerate and describe the deep-sea Isopoda of the families Apseudidæ, Tanaidæ, and Anthuridæ, which have been taken by the recent English dredging expeditions in the "Lightning," "Valorous," and "Porcupine." In all, twenty-six species are enumerated, of which seventeen are new. Several new genera are characterized: *Sphyrapus*, *Tanælla*, *Alaotanais*, *Cyathura*, *Anthelura*, *Hyssura*, and *Calathura*. Several changes are introduced in the names of the North American forms. *Leptochelia algicola* Harger is regarded as synonymous with *L. savignyi* Kroyer and *L. dubia* Kr. *Anthurus brunnea* Harger and *A. polita* Stm. are referred to *Cyathura carinata* (Kr.). *Anthurus brachiata* Stm. is made the type of the new genus *Calathura*. Under the general account of the family Tanaidæ are some very interesting remarks on the existence of two forms of males in this group.

**Molluscs of Lake Tanganyka.**—Pelseneer gives a list of twenty-five species of terrestrial and fluviatile molluscs brought back from the neighborhood of Lake Tanganyka by Captain Stormes. Among the most interesting points made out are the anatomy of the genus *Pliodon*, which throws light on the relationship of this mollusc, the affinities of which were uncertain before. He finds that it is distinguished from the Unionidæ by two posterior orifices, a rather long pallial sinus separating the branchial and pedal orifices; the mantle cavity is completely divided into anal and branchial chambers by the branchiæ; and by the shapes of the labial palpi. The affinities are rather with *Mutela*, *Spatha*, *Triquetra*, and other members of the family Mutelidæ of H. and A. Adams. The terrestrial molluscan fauna of the region is not specially interesting, but that of the fresh-waters has been characterized as "marine" in its facies. This aspect Pelseneer does not recognize.

**Echinoderm Morphology.**—Ph. H. Carpenter, the able English student of the living Crinoids, has recently published two papers on the morphology of the Crinoids, in review of the account of *Antedon rosacea* given by Vogt and Yung in their "Traité d'Anatomie Comparée Pratique." In one (*Annals and Magazine Natural History*, January, 1887) he reviews almost every point made by the authors, and points out many sins of omission and commission. The second paper is in the *Quarterly Journal of Microscopical Science* for the same month, and deals with what Vogt and Yung regard as symbiotic algæ, but which have been previously called sacculi. He shows by their structure, relationship to different species of Comatula, their development, and other points, that they cannot be algæ, and thinks that their nature is still as obscure as it was before the publication of the "Traité Pratique" was published.

**Nettle-Cells.**—R. von Lendenfeld has a paper on the function of the nettle-cells of Cœlenterata in the January number of the *Quarterly Journal of Microscopical Science*. Nettle-cells are defensive structures situated in the ectoderm, and usually also in the endoderm, of all Polypomedusæ. Their structure is some-

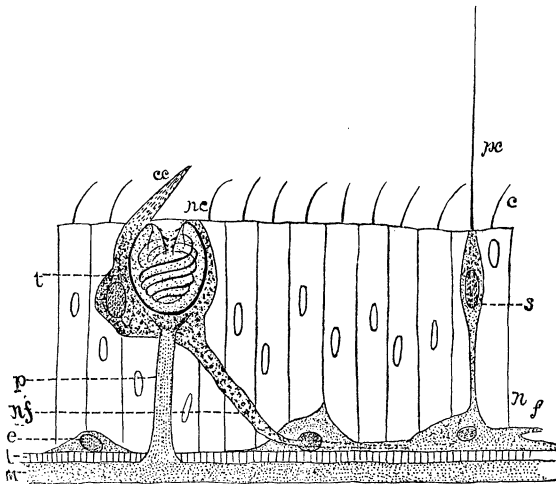


Diagram of a nettle-cell with the surrounding nucleated columnar epithelium: *c*, cilia; *ce*, cnidocil; *e*, sub-epithelial muscle-cell; *f*, tangential nerve-fibre; *l*, longitudinal striated muscles; *m*, mesodermal supporting lamella; *n*, ganglion-cell; *nf*, nerve connecting ganglion-cell with *ne*, nettle-cell; *p*, peduncle of Hamann; *pc*, palpicil connected with *s*, sense-cell; *t*, thread coiled up inside of nettle-cell.—After Lendenfeld.

what complicated. They consist each of a single cell hollowed within to contain a long spirally coiled thread, and produced at the surface into a strong process,—the cnidocil,—which

projects in the direction from which foreign objects are most likely to reach the organism. Under proper stimulus the nettle-cell contracts, forcing out the contained thread, which becomes turned inside out during the operation, as one may invert the finger of a glove. It is this thread—or rather multitudes of them, each charged with poison—which produces the well-known nettling effects of many jelly-fishes. The thread is forced out with great force, and penetrates soft bodies, bearing the poison with it. The question is, What is the physiology of the contraction? Lendenfeld reviews the previously existing ideas and shows their weak points. His own view is that the action of these structures is to some extent voluntary and under control of the ganglion-cells. The contraction of the peduncle of Hamann withdraws the nettle-cell below the surface under certain circumstances. Contraction of the nettle-cell itself and the forcing out of the thread is reflex; the cnidocil is the sensory organ, and on the application of stimulus to this the act takes place. The granular peduncle first described by Lendenfeld is regarded as the nerve-fibre connecting the nettle-cell with the nervous system of the animal. Von Lendenfeld's figure, reproduced here, will elucidate the structures concerned.

**Some Rare Indiana Birds.**—The present winter in Indiana has been remarkable for the occurrence in this State of several species of birds which are not often seen here. The rarest of these is perhaps the Evening Grosbeak (*Hesperiphona vespertina*). On Saturday, January 22, Mr. Charles H. Bollman saw and shot a single specimen of this rare bird on the campus of the State University at Bloomington. On the same day, Mr. Cal. Meridith and a companion, at Frankfort, one hundred and twenty-five miles north of Bloomington, saw a flock of twelve, from which they secured five. I learn that one or more specimens were seen about the same time in Lake County by members of the Ridgway Ornithological Club, who were enjoying a sleigh-ride in that part of Indiana. A few days later two other specimens were seen in the vicinity of Frankfort. This is, I believe, the first record of the occurrence of the Evening Grosbeak in Indiana.

From all parts of the State come reports of captures of Snowy Owls. I hear of three at Lebanon, three at Valparaiso, six at Indianapolis, one at Greencastle, two at Martinsville, one at Sullivan, and two each at Columbus and Greensburg. These no doubt represent not more than one-half of the number actually taken in the State. They were most abundant in November, and none have been reported since the 1st of January. Short-eared Owls have also been reported much more common than usual, and Bald and Golden Eagles have been taken with unwonted frequency.

"In this connection it is proper to record the occurrence of the

Florida Snake-Bird (*Plotus anhinga*) in this State. According to Mr. Fletcher M. Noe, of Indianapolis, a fine male, in full plumage, was taken on the West Fork of White River, two miles south of Indianapolis, on August 25, 1886. A month later Mr. Noe received a specimen of the Western Grebe (*Aechmophorus occidentalis*), which was killed near the same place.—B. W. Evermann, *Indiana State Normal School*, February 14, 1887.

ZOOLOGICAL NEWS.—BIRDS.—At the recent Scientific Congress at Paris, M. de Montessus read a memoir upon the present state of ornithological science in Paris. Among other facts he mentioned the capture of *Synoicus lodoisiæ*, an Australian gallinaeous bird, in the Department of Sâone-et-Loire. Previously a specimen had been killed in Lombardy, and these are the only specimens known to have been taken in Europe, but are sufficient to cause the enumeration of the species among the casual visitors to that country.

WORMS.—Mr. James E. Benedict describes one new genus and five new species of tubicolous Annelids in the "Proceedings U. S. Nat. Museum for 1886." All of them are from the warmer waters of America, and were collected by the Fish Commission steamer "Albatross."

MOLLUSCA.—Paul Pelseneer, in the "Bulletin Sci. Dépt. Nord," II., vol. ix. (reprinted in the *Annals and Magazine of Natural History* for January, 1887), gives a review of the Gymnosomatous Pteropods. He recognizes only six genera, arranged in four families among the previously described species, but describes a new genus and species, *Notobranchæa mcdonaldi*, from off the coast of the Carolinas. Only a single specimen is known, which is in the United States National Museum. The foot-notes appended to the reprint of the article add considerably to the value of the paper.

ECHINODERMS.—Rev. J. G. Swan calls attention, in the *Bulletin of the United States Fish Commission*, to the abundance of Holothurians in the region of Queen Charlotte Islands and in Alaska, and suggests that it may prove profitable to collect and cure them into trepang for the Chinese market. In China they command a price of about forty or fifty dollars a ton, and their preparation is not very difficult.

SPONGES.—At a recent meeting of the Zoological Society of London, Dr. R. von Lendenfeld read a paper on the classification of sponges and their systematic position. His extensive investigations in the rich sponge fauna of Australia, as well as on the collections of the "Challenger" expedition, have given him facilities rarely excelled. He proposed an arrangement in which



forty-six families were described and the principal genera enumerated. His paper also contained a tolerably complete bibliography of the subject, the size of which is shown by the fact that it embraced the titles of fourteen hundred and forty-six papers. The systematic position of the sponges was also discussed.

#### EMBRYOLOGY.<sup>1</sup>

**Haddon's Introduction to the Study of Embryology.**<sup>2</sup>—This new work, now in press, is apparently designed to give the student a comprehensive outline of the science of embryology in a moderate compass, with such illustrations as will enable him to appreciate the fundamental similarity of many of the stages of the embryos of the different classes and orders of the Metazoa as represented by specific forms. A manual of this sort has been very much needed for the class-room. The monumental treatise of Balfour, in two volumes, already needs revision, so fruitful have been the labors of active embryological workers within the last five years, or since its completion. That activity itself has been very largely due to the stimulus given to ontogenetic research by that singularly endowed genius, lost to us before he had had time to develop the germs of the great generalizations and suggestions which are so lavishly strewn through the pages of his great work. Balfour's large work, also, is not adapted to the purpose of a class-room manual, and can only be used as a book of reference or as a guide to the advanced student. In the first volume, and the early part of the second, the groups are treated of separately and not directly and comparatively, so that it is not well adapted to serve as a text-book for the laboratory in elementary work. Other elementary text-books use only extremely modified forms, such as the chick and the mammal, as types; other lower groups being scarcely alluded to. This tends to develop a bias in the mind of the student which it is hard for him to shake off, and in extending the range of his studies he finds himself almost unwittingly trying to attempt to apply his knowledge of the development of the higher forms to that of the lower, with the result that he becomes confused in making his comparisons. To overcome this difficulty we need an elementary work which will contrast the higher and lower types at once, and in such a way as will lead the student to at once see the agreements and differences in the methods of development of different types. It is especially important to show what a profound influence the presence of a larger and larger amount of yolk has had in modifying gastrulation; how the types of cleavage have been apparently modified from the same cause,

<sup>1</sup> Edited by Dr. JOHN A. RYDER, Philadelphia.

<sup>2</sup> *An Introduction to the Study of Embryology*, by Alfred C. Haddon, M.A., Professor in the Royal College of Science, Dublin. London, 1887.